

DEPARTMENT OF MINES AND RESOURCES
BUREAU OF MINES
CANADA

Ottawa, May 30, 1946.

R E P O R T
of the
ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 2056.

Examination of Saskatchewan Bentonite for
Foundry Use.



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Bureau of Mines
Division of Metallic
Minerals

Physical Metallurgy
Research Laboratories

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Mines and Geology Branch

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Origin of Material and Object of Investigation:

On April 26, 1946, a request was received by H. S. Spence, of the industrial minerals section of the Metallic Minerals Division, Bureau of Mines, from Mr. Bert Honeyman, secretary-treasurer of Pembina Mountain Clays Limited, Winnipeg, Manitoba, for an examination of three samples of Saskatchewan bentonite to determine their suitability for foundry work. The samples were received on April 29, 1946, and were submitted to the moulding sand research laboratory operated in connection with the experimental foundry of the Physical Metallurgy Research Laboratories, Bureau of Mines.

Identification of Samples Received:

The samples were labelled as follows:

- No. 50 - Top seam.
- No. 51 - Centre seam.
- No. 52 - Bottom seam.

Method of Testing:

The samples were ground in a pebble mill to 75 per cent minus 200 mesh. Although this is somewhat coarser than most commercial bentonites, results are comparable with finer-ground material, as there is a further breaking-down of bentonites when they are mixed with water.

The samples were mixed with a commercial core sand in a weight ratio of 100 sand to 4 bentonite.

Results of Tests:

The sands at temper (optimum moisture content) possessed the following properties:

<u>Sand Bonded with Bentonite No.</u>	<u>Green Bond (p.s.i.)</u>	<u>Green Deformation (in./in.)</u>	<u>Dry Bond (p.s.i.)</u>
50	5.4	0.006	36
51	1.0	0.001	--
52	1.0	0.001	--

Sample No. 50 was tested for hot strength, and the following results were obtained:

<u>Temperature, °F</u>	<u>Compressive Strength, p.s.i.</u>
Room	40
500	31
1000	37
1500	45
2000	43
2500	12

Discussion:

It is evident that Sample No. 50 (from top seam) is the only one which possesses the binding properties of bentonite. The other two samples appear to be an impure form of volcanic ash, and have no value as foundry binders. Possibly they would have some merits as substitutes for silica flour in moulding sand mixtures.

Sample No. 50 possesses similar properties to the southern bentonites, and to the sample of Pembina bentonite discussed in Report of Investigation No. 2053 (dated May 21, 1946). It more closely approaches the properties of bentonites from the southern United States than does Pembina bentonite, which has a higher green strength and lower dry strength than typical southern bentonites. The high hot strength of Sample No. 50 at 2500° F. is probably due to the presence of volcanic ash as an impurity.

The use of this type of bentonite in foundry work is discussed in Report of Investigation No. 2053, which is a report on the similar Pembina Mountain bentonite.

Conclusions:

1. Sample No. 50 (from top seam) is the only one of the samples submitted that is suitable for foundry work.
2. Sample No. 51 and 52 (from centre and bottom seams) appear to be volcanic ash, with possibly some bentonite present as an impurity.
3. Sample No. 50 is of the southern bentonite type. The use of this type of bentonite is discussed in Investigation Report No. 2053, dated May 21, 1946.

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